CLAIMS

WHAT IS CLAIMED IS:

1. A high speed data bus comprising:

a plurality of serial busses communicatively interconnecting a plurality of nodes; and

a controller for selectively enabling communication over the serial busses based on an operational condition of the data bus;

said serial busses interconnecting the nodes in a ring topology such that the data bus continues to function when the operational condition includes a device fault.

2. The data bus of claim 1 wherein the serial busses are daisy-chained busses.

3. The data bus of claim 2 further including:

a plurality of dedicated power supplies corresponding to the plurality of daisy-chained busses for providing isolated power to the daisy-chained busses; and

isolation components connected between physical layers and link layers of the nodes such that each daisy-chained bus defines an isolated physical layer fault zone.

4. The data bus of claim 2 wherein the controller includes:

a detection module for detecting the device fault, the device fault interrupting communication over a first daisy-chained bus;

a recovery module for switching communication from the first daisy-chained bus to a second daisy-chained bus in response to detection of the device fault; and

a diagnosis module for identifying the device fault while the communication is switched to the second daisy-chained bus.

5. The data bus of claim 4 wherein the controller further includes a continuous pulse transceiver for transmitting and receiving a continuous pulse over the daisy-chained busses, the device fault causing an interruption in the continuous pulse transmitted over the first daisy-chained bus.

6. The data bus of claim 5 wherein the device failure is a physical layer power failure for the first daisy-chained bus.

7. The data bus of claim 5 wherein the device failure is a propagated failure in the first daisy-chained bus.

8. The data bus of claim 5 wherein the device failure is a link layer device failure in one of the nodes.

9. The data bus of claim 4 wherein the diagnosis module includes:

a configuration switch for stepping through possible configurations of the first daisy-chained bus; and

a test module for determining whether configurations are valid.

10. The data bus of claim 2 wherein the controller is contained within one of the nodes.

11. A method for communicatively interconnecting a plurality of nodes to form a high speed data bus, the method comprising the steps of:

interconnecting the nodes with a first serial bus in a daisy-chain configuration having a first end and a second end;

interconnecting the nodes with a second serial bus in the daisy-chain configuration; and

connecting the first end to the second end such that the serial busses form a ring topology.

12. The method of claim 11 further including the step of selectively enabling communication over the serial busses based on an operational condition of the data bus.

13. The method of claim 12 further including the steps of:

detecting a device fault, the device fault interrupting communication over the first serial bus;

switching communication from the first serial bus to the second serial bus in response to detection of the device fault; and

identifying the device fault while communication is switched to the second serial bus.

14. The method of claim 13 further including the steps of:

transmitting a continuous pulse over the first serial bus in a first direction around the ring topology;

receiving the continuous pulse from a second direction when the first serial bus is operating without device faults; and

detecting an interruption in the continuous pulse when the device fault occurs.

15. The method of claim 11 further including the step of using daisy-chained busses for the serial busses.

16. A method for selectively enabling communication over a plurality of serial busses, wherein the serial busses are connected in a ring topology, the method comprising the steps of:

detecting a device fault, the device fault interrupting communication over a first serial bus;

switching communication from the first serial bus to a second serial bus in response to detection of the device fault; and

identifying the device fault while communication is switched to the second serial bus.

17. The method of claim 16 further including the steps of:

transmitting a continuous pulse over the first serial bus in a first direction around the ring topology;

receiving the continuous pulse from a second direction when the first serial bus is operating without device faults; and

detecting an interruption in the continuous pulse when the device fault occurs.